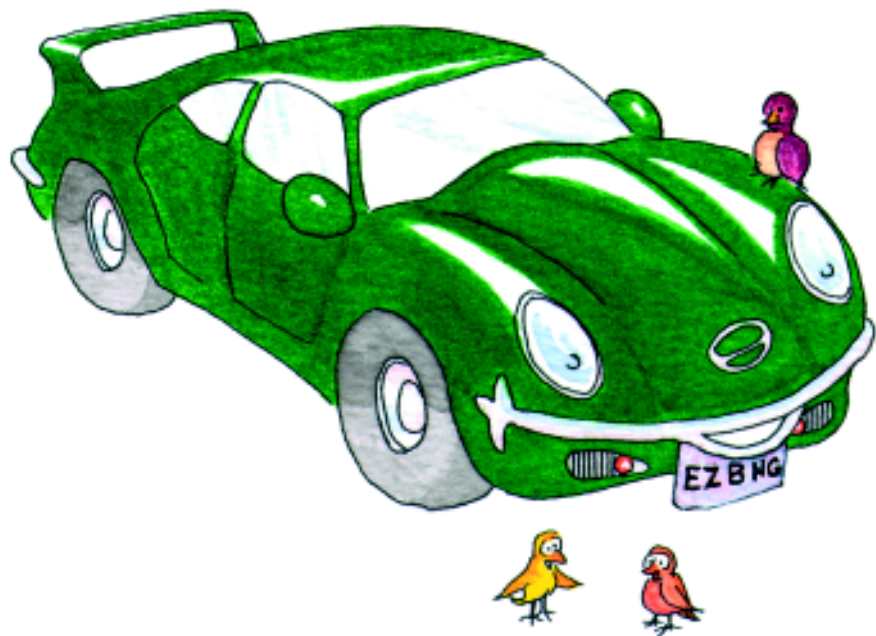


THE GREEN(ER) MACHINE



MO•TO•RISTS, AN EX•CLA•MA•TION:

THIS BOOK HAS IMPORTANT IN•FOR•MA•TION!

ABOUT YOUR CAR, AU•TO•MO•BILE

AND WHAT YOU DO WHEN YOU'RE BE•HIND THE WHEEL.

WE'RE TALK•ING HABITS, FOS•SIL FUELS,

EX•HAUST E•MISSIONS, CLEAN AIR RULES.

SO TURN THE PAGES, TAKE THIS AD•VICE,

TO MAKE YOUR CAR ENVIRON•MEN•TALLY NICE.

IF YOU THINK ALL THIS IS ON•LY TALK

DO THE WORLD A FAVOR —

WALK.

From the roadsters of the Jazz Age, to the compacts of the Rap Age, to the SUVs of the Information Superhighway, cars have been at the center of American life. We favor the automobile over all other forms of transportation, chiefly for the convenience four wheels and an engine provide.

Convenience, however, is a transitory thing. The comforts of one age become the bane of the next. So it is with the automobile. We now know that the freedom to boldly go wherever the black-top leads comes with high, sometimes hidden, costs.

We pay dearly for the privilege to drive with smog, ozone alerts, and groundwater polluted by spilled gasoline and oil. We spend billions of public dollars to build and maintain roads and to defend foreign oil supplies, funds that otherwise might be spent on schools, health care or public transportation. We sacrifice urban neighborhoods and rural farmland for highways; lose precious hours commuting or idling in traffic jams; and burn a costly, imported nonrenewable fossil fuel just to pick up a quart of milk and a newspaper. If all the costs of auto transporta-



tion were passed on to drivers, a gallon of gas would run more than \$4.50.

Yet the gasoline-powered automobile is here to stay – for a while. Magnetic trains, and electric- and hydrogen-fueled vehicles will probably transport us in the not-so-distant future, but until then, we'll have to make do with the internal combustion engine.

This manual features tips and techniques for operating and maintaining your vehicle in an environmentally sound manner. Follow this advice and soon you'll be behind the wheel of a "green" machine.

Air Conditioner

Turn it off! The A/C consumes nearly a gallon of gas per tankful to keep you cool. So you will save money and reduce your contribution to global warming by turning your A/C on only when you really need it.

Furthermore, many auto air conditioners contain chemical refrigerants that harm the atmosphere if they get loose. Pre-1995 models used about three pounds of chlorofluorocarbons (CFC-12, commonly known as Freon), compared to just a few ounces in a typical home refrigerator. When those CFCs leak out, they damage the stratospheric ozone layer. (see "OZONE")

International agreements have nearly phased out the production of CFCs worldwide, and since 1995 automakers have switched to hydrofluorocarbons (HFCs), which do not harm the ozone layer. BUT the HFC molecules are even stronger than CO₂ at warming the atmosphere,

so we still have to keep them under control. (see “GLOBAL WARMING”)

What can you do with your current cooler? Have it checked frequently. If it's leaking, bring it to a reputable service station that collects and recycles the remaining refrigerants, as required by state and federal law. Wisconsin regulations don't allow the mechanic to “top off” a leaky system (right now it's the **ONLY** state with this law)—you can either have it fixed or disconnected, balancing coolness versus cost. Or consider converting old CFC-systems to the new HFCs—it should cost about the same as a repair and you will gain energy efficiency.

Do-it-yourselfers take note: This is a job you should leave to the experts—not only do they have the right equipment and training, they're also the only people allowed by law to work on A/Cs.

If you insist on using the air conditioner, minimize the impact—drive a light-colored car with a light interior and park in the shade. And use those handy inside-the-windshield sun-blockers. It takes more energy to cool a hot car than it does to cool a medium-sized home in Atlanta during the summer!

One final note—make sure the refrigerant will be properly recovered and recycled when you bring your Green Machine to the junkyard. (see “SALVAGE YARDS”)

BATTERY

That bulky plastic box of lead, sulfuric acid and hydrogen generates electricity to start your car and run your car lights, heater fan, and stereo. If you have the kind of battery that can be opened, check the water level twice a year and add distilled water if it's low. Sealed units with “indicator eyes” will tell you when it's time to replace your battery. Auto batteries last from two to five years, depending on quality, use, and maintenance.

Recycling old batteries is a breeze. All vehicle battery retailers in Wisconsin must accept lead-acid batteries at no charge from people who purchased their batteries from them. If you bought the battery somewhere else, the retailer can charge you up to \$3; but depending on the price of lead, a retailer may pay **YOU** for the battery. The recycled lead is used to make new batteries, cable coverings, radiation shielding and

other products. The acid may be used in new batteries or fertilizer, or neutralized for safe disposal. Plastic casings are recycled into new casings, wastebaskets and other items.

Wear safety goggles and gloves when you pick up a battery, and carry it in a wooden box or leak-proof container. To avoid explosions, don't smoke near batteries. If you drop a battery, neutralize any spilled acid with baking soda or lime, and lots of water.





Car Sharing

Car payments, repair bills, registration, insurance, traffic jams, parking hassles, and POLLUTION – who needs it?

Individual car ownership makes less sense when you learn about cheaper, greener options.

A car sharing service makes vehicles available to people on a per-use basis. Think of it as neighborhood-based, time-share car rental. You use the vehicle only when you need

it, and pay based on how much you drive. Cars are kept in small neighborhood lots within easy walking distance. When you need a car, simply ring up and reserve it. At the end of the month you receive a bill in the mail as you do for any other utility. Talk about convenient!

Check out the many new car share programs springing up all over the world by visiting <http://www.carsharing.net>. You might just get motivated to start a car share service in your community!

Car Wash

When you give your ride a bubble bath, choose mild soaps without phosphates and use them sparingly. (Why? Aquatic weeds thrive on phosphates, and oxygen is used up when the overgrown weeds decompose, leaving little for fish to breathe.) Rinse the suds onto grass to let the soapy water be absorbed gradually through the soil. Avoid washing detergents down stormwater drains – few cities treat stormwater before it's flushed into lakes and rivers. Encourage your favorite car wash to use phosphate-free soaps. Wax the beast every now and then to hold rust at bay. (see “PAINT”)



Bicycle

It's not just for recreation. This practical form of transportation deserves your respect and attention. Across the U.S., occasional biking can save more than 700 million gallons of fuel each year. Try biking to work once or twice a week. Add a wire basket and you can run errands on two wheels instead of four. When you do drive your car, give bicyclists a break – share the road!

CARPPOOL

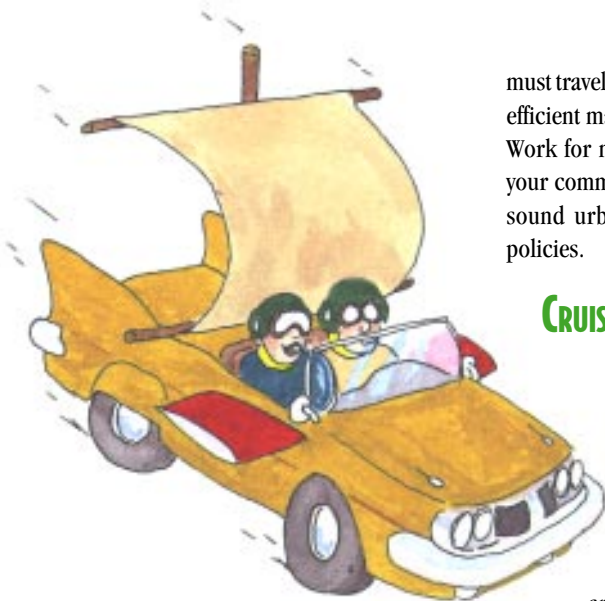
Here's a quick, easy, mathematically elegant way to eliminate rush hour and cut auto exhaust emissions by 50 percent: Put two commuters in a car instead of one. Besides doing everybody's lungs and blood pressure a favor, carpooling commuters save gas and cash; can be relieved of daily driving chores; meet new people; catch up on reading; and witness democracy in action when riders debate the choice of radio station. Some companies provide vans for ride-sharing employees and the Department of Transportation (DOT) offers loans to companies seeking to purchase carpool vans. Call (608) 266-8508 for details. For general ride-sharing information in the Milwaukee area, call 1-800-455-POOL, or visit the DOT website at <http://www.dot.state.wi.us>. In Madison, dial (608) 266-RIDE.

CITY PLANNING

Nearly half the space in American cities is used to accommodate vehicles. But six-lane highways and cavernous concrete parking ramps

make cities less livable and suburbs more accessible. Car commuters converge on downtown workplaces in the day, creating traffic jams and smog, then abandon the city at night.

More compact, pedestrian-designed urban spaces with a mixture of residences, offices, stores and parks shorten the distance people



must travel to work and shop. Safe bicycling and efficient mass transit then become more viable. Work for measures to control urban sprawl in your community and urge planners to consider sound urban design in future transportation policies.

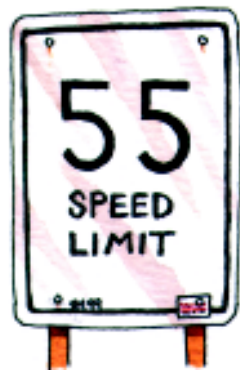
CRUISING INTO THE FUTURE

The time when we all can say “no tanks” to gasoline may be coming sooner than we think. Cleaner burning fuels such as propane and natural gas are already being used in motor vehicles. Battery-powered electric and hybrid-electric vehicles (packing an electric motor, a gasoline or diesel engine, and a fuel tank) are available from several major auto manufacturers. Solar powered electric cars or fuel cell vehicles powered by hydrogen will whisk motorists down the road in five or ten years. Give new fuels and technologies a try as they become available. And encourage your elected public officials to support research into alternative fuels.

DRIVING TIPS

Idling wastes gas and can damage pollution control equipment. Most cars need only warm up for a minute or so to allow oil to circulate. Turning off the car and starting it again uses less gas than idling for a half-minute or more.

- Combine errands into one trip. The engine uses less gas once it's warmed up.
- Accelerate and decelerate slowly and smoothly — it'll save you up to 2 mpg. Anticipate stops and coast up gradually: It takes 20 percent less gas to accelerate from 5 mph than from a full stop.
- Drive the speed limit on the highway. At higher speeds, you'll burn more gas for each mile you drive.
- Cruise control: use it sparingly when traveling over varied terrain. In mountainous or hilly regions, you'll waste less gas if you hold a constant throttle position instead of using cruise control. To do this, just maintain a steady foot angle.



- When you're driving in summer, close the windows and turn on the fresh air vents. At speeds over 40mph, the drag caused by open windows eats up more gas than a working air conditioner.
- Shift a manual transmission into the highest gear as soon as possible to use the engine most efficiently.
- Keep your engine running at peak fuel efficiency with regular tune-ups and by responding promptly to the "service engine soon" light on your dashboard. (see "ON BOARD COMPUTER")

EXHAUST

Produced when gasoline is burned in an internal combustion engine. (see "INTERNAL COMBUSTION") The main offenders:

Carbon monoxide — An invisible, odorless, poisonous gas emitted when engines burn gas inefficiently and when cars are idling or moving slowly in traffic. Levels are highest in urban areas just after morning and afternoon rush hours.

Carbon dioxide (CO_2) — Humans and animals inhale oxygen and exhale carbon dioxide; plants take in carbon dioxide and release oxygen. Large-scale burning of coal, oil and gasoline have overloaded the air with CO_2 . (see "GLOBAL WARMING")

Hydrocarbons and nitrogen oxides — Cars discharge hydrocarbons (organic compounds present in gasoline) and nitrogen oxides (NO_x). In the presence of sunlight, these compounds form ground-level ozone, the primary component of smog. Children, the elderly, people with respiratory ailments and healthy people exercising outdoors may have difficulty breathing when ozone levels are high.

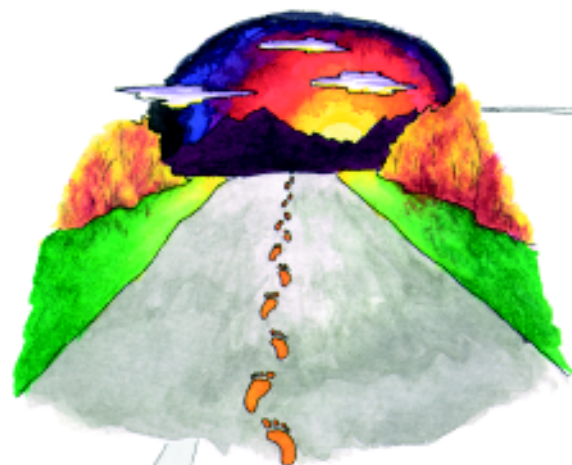
Particulate matter – Exactly what you’d think – particles. Burning any fuel – gas in a car, diesel in a truck, leaves in a pile, or garbage in a barrel - releases sooty particles. Some of the particles are so small that they are invisible to the naked eye. When you breathe in these fine particles, they clog your lungs. The smaller the particle, the more harmful it is because it can creep deeper into your lungs.

Nitrogen oxides and other compounds, notably sulfur dioxide, contribute to acid rain. Acidic precipitation destroys forests and raises the pH of freshwater lakes, making them less hospitable to fish and other aquatic life.

E.Y.I. Registered vehicles in Wisconsin counties that don’t meet federal air quality standards are required to pass emissions tests. (see “TUNE-UP”) If you aren’t sure about your county, visit Air Management on the DNR website at <http://www.dnr.state.wi.us>.

The U.S. continues to improve emission standards, but the vehicle population of the U.S. is growing more than six times faster than the human population, offsetting most of the pollution reductions. And each time the laws are strengthened, years must pass before the entire fleet of U.S. cars actually meets the new standards. But how many cars will be on the roads then? Only you can decide.





FEET

Use 'em for transportation whenever you can. It's easy: Put one foot in front of the other and go. Best of all, you never have to worry about locking your keys in the car.

FILL 'ER UP

Volatile hydrocarbon vapors are released into the air when you fill your tank. Whenever possible, patronize service stations with vapor-recovery nozzles on gas pumps. Take care when the tank is nearly full – those little drips and drops of spilled gas are a major source of pollution.

Did you know it's best to refuel by moonlight? (More romantic, too.) Gasoline generates fewer hydrocarbon vapors when it's cool and dark outside. Detergent gasolines keep engines running cleaner and emit fewer pollutants. And that dastardly gas cap you always leave on the roof of the car? Try to remember to screw it back

on, because it prevents vapors from escaping into the atmosphere. Also, if you forget to replace it or you don't tighten it until it clicks several times, it could signal your car's computer to turn on the "service engine soon" light on the dashboard.



FLUIDS

Besides oil and gas, there are other essential automobile fluids, including antifreeze, brake fluid, and transmission or power steering fluid. Check all fluids regularly. When they need to be changed (see your owner's manual for the recommended maintenance schedule for your vehicle), collect the old fluid in a leak-proof container with a lid and bring it to a service station or auto repair shop for recycling. You may be charged a small fee. By the way – please don't mix these or any other liquids with used oil you want to recycle. (see "OIL") Easier yet, bring the car to the service station and let the technician change those fluids for you.

There's one more fluid worthy of mention. During the summer months, dilute your windshield wiper fluid with water. Half-and-half or even 75 percent water will still give the desired results. Don't forget to switch it back before the freezing fall temperatures!

GLOBAL WARMING

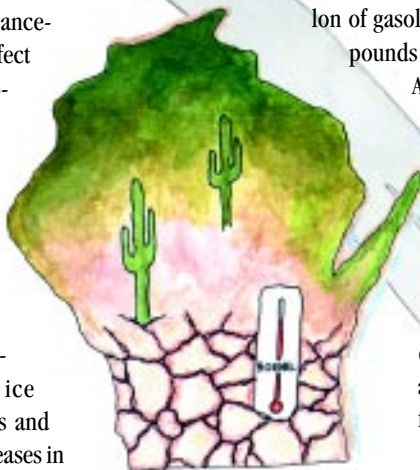
Burning gasoline, oil and coal releases carbon dioxide (CO_2) into the air. The CO_2 collects in the atmosphere, where it acts like the glass in a greenhouse, trapping heat and reflecting it back to Earth.

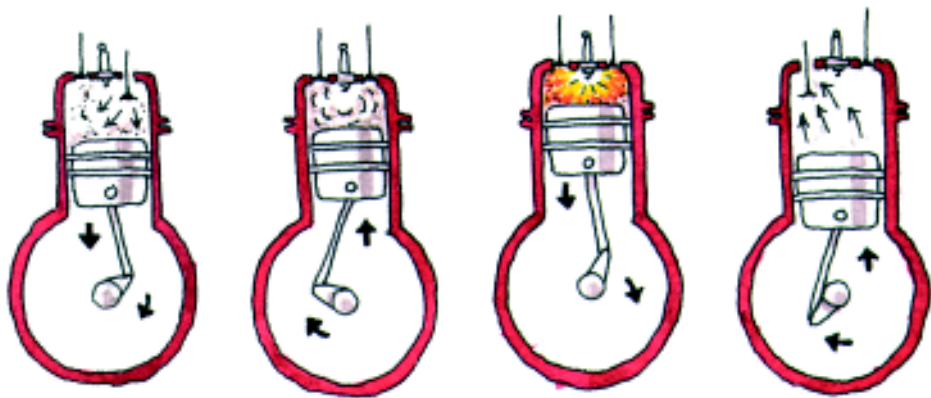
Scientists believe that the CO_2 collecting in the atmosphere from fossil fuel combustion has raised the planet's temperature and will continue to do so. This "enhancement" of the greenhouse effect not only tampers with the global thermostat - it confounds other climate cycles, too. While Wisconsinites might very well welcome warmer winters, climate changes caused by this warming could be devastating for many parts of the world, including Wisconsin. Polar ice could melt, raising sea levels and swamping coastal areas. Increases in global average annual temperatures of

only a few degrees could disrupt rainfall patterns and create deserts in major crop growing regions (like Wisconsin). This could seriously affect agriculture, water resources, forests, fish, and other living things.

Cars and other motor vehicles are responsible for about one-third of the CO_2 emitted into the atmosphere in the U.S. For every gallon of gasoline burned, about twenty pounds of CO_2 is emitted.

A car powered by fossil fuels emits more than its own weight in CO_2 each year (depending on its fuel efficiency and how many miles it is driven). Ever try to pick up a car? Take it easy on yourself AND the air—get the most fuel-efficient car you can afford.





INTERNAL COMBUSTION

This is what happens when a) you consume pizza, a jumbo burrito and a bowl of chili in a single sitting, or b) you drive. Briefly, here's what's going on in a four-stroke, internal combustion engine (like most cars have):

When you step on the gas pedal, volatile flammable gasoline, one of the many products refined from crude oil, is mixed with air. The vaporized gasoline is channeled into a cylinder, a tube sealed at one end and blocked at the other by a movable plug called a piston, which is at-

tached to a crankshaft that changes the piston's linear motion into rotary motion. Most cars have three, four, five, six or eight cylinders.

As the piston moves up the cylinder, it compresses the gas/air mixture. When the mixture is tightly compressed, the spark plug produces a spark that ignites the mixture trapped in the cylinder. The gas burns and expands, increasing the pressure on top of the piston and forcing it down, turning the crankshaft. The rotation of the crankshaft moves the piston up a second

time, an exhaust valve opens at the top of the cylinder and the gases created from burning the gasoline vapor rush out with a loud noise. These four cycles (intake, compression, power and exhaust) are repeated several hundred times a minute in each cylinder.

Gases that don't burn completely pass through a catalytic converter and other pollution-control features, where they are burned completely and the byproducts are released out the tailpipe. (see "EXHAUST" and "ON BOARD COMPUTER") These exhaust emissions are what give environmentalists (and anyone else who breathes) a different kind of internal combustion.

LEAKS

Slimy spots on the driveway mean it's past time to check the engine, transmission and radiator for leaks. When it rains, oil and other automotive fluids are washed off pavement and into storm sewers, lakes and rivers. And, automotive fluids aren't cheap – why let them drip away? Plug those holes!

MPG

Miles per gallon, a measure of how efficiently your car uses gasoline.

Lump America's gas guzzlers and gas sippers together and you arrive at an average of 24 miles per gallon (mpg) per car nationwide. That's better than the 10-mpg gashogs of the '60s and '70s but more people are driving more miles today, which offsets the benefits of higher mpg. Also, the popularity of SUVs (sport utility vehicles) and other large vehicles has exploded, and consumer demand for these greedy beasts is threatening to drive the national mpg back down to pre-1980 levels.

Our cars are thirsty rascals, soaking up billions of gallons of gasoline nationwide each year. Oil consumption has grown about seven percent per year for the past 50 years. At this rate, consumption doubles every ten years – an exponential growth rate. Here's the pitch: If each driver could reduce gas consumption by only 10 percent – a measly 10 percent! – we'd save more than eight million gallons every day.

Keep tabs on your mpg. Fill the tank until the nozzle clicks. Write down the number of miles on the odometer. Next time you fill up, do the same thing. Then divide the number of miles you've gone since the last fill-up by the number of gallons you just put in. That's your mpg. When the mpg drops by more than 20 percent, it's time for a check-up – and by now your “service engine soon” light may be on to remind you. (see “ON BOARD COMPUTER”)

NEW CAR

Go for the highest mpg in the vehicle that will best suit your needs.

Avoid buying a light truck unless you really need it. Pickups, vans, minivans, and sport utility vehicles (SUVs) are less fuel-efficient and pollute more than passenger cars.

If you have Internet access, check out EPA's Fuel Economy Guide (<http://www.epa.gov>) for your preferred model year to help narrow your search or to investigate a particular model. You can also browse other sites for various “green guides” containing information about emissions by specific vehicles and other helpful hints for choosing a car [e.g., Consumer Reports, American Council for an Energy-Efficient Economy (ACEEE), etc.].





Oil

Low or dirty oil (or low *and* dirty oil) hurts engine efficiency and may increase harmful emissions. Check the dipstick regularly and change the oil as recommended by your owner's manual (usually about every 3,000 miles or three months).

Americans use more than a billion gallons of motor oil each year. Over a quarter of that oil is discarded into places where it doesn't belong, like lakes, streams, wetlands, backyards, storm sewers, open fields and road shoulders. Not a

good idea – a single gallon of used oil, if improperly managed, has the potential to contaminate up to one million gallons of drinking water!

Most automotive service centers recycle used oil. With a minimum of reprocessing, oil can be used again in cars or burned as a high-energy industrial fuel.

Do-it-yourself (DIY) oil changers can recycle oil in four simple steps:

1. Drain the oil into a pan large enough to hold as many quarts as your vehicle's crankcase. (The average car uses about five quarts.) The pan should be clean, and not have been used for paint, solvents, antifreeze or anything else that might contaminate the oil.

2. Using a funnel, pour the oil from the pan into leak-proof containers with lids – clean plastic gallon milk jugs work well. Don't mix that oil with anything else. If you change the filter, empty the old filter by inverting it over the pan and letting it drain overnight. Plug the hole of the old filter with paper towels, and put it in the box the new filter came in. Put on the new filter, put in the drain plug (very important) and add the new oil to the crankcase.

3. Bring the old oil and the old filter to a used oil collection site. It may be at a service station, auto parts store, quick oil change business, oil retailer, or city or county vehicle maintenance shop. For the site nearest you, contact your county or town public works department.

4. Pour the oil in the collection tank, properly discard the old filter, cap your containers, save them for the next change, and pat yourself on the back for a job well done.

ON BOARD COMPUTERS

Blink. Your car is talking to you. The light on your dashboard may say “check engine,” or “service engine soon,” or something similar. Your technician may refer to this as a “malfunction indicator lamp” or a “MIL light.” This is your car's way of telling you something is wrong.

Since 1986, cars have been factory-equipped with on-board computers designed to notify you at the first sign of trouble. Your technician may refer to these systems as “on-board diagnostic” (OBD) systems. OBD systems monitor your vehicle's operation and performance to keep it



running cleanly and efficiently. OBD can also give you advance warning to perform maintenance and help you avoid costly breakdowns. When your MIL light comes on, your car's computer will generate an internal code that will give a properly trained and equipped technician an idea of where to begin looking for the problem.

For proper service procedures, read your vehicle owner's manual. It is usually OK to drive your vehicle short distances with the MIL light on until it can be serviced, unless the light is flashing, another warning light comes on, you detect a strange noise or smell, or the vehicle is generally running poorly.

OZONE

O₃. There are two kinds, chemically identical: Good ozone, a naturally occurring layer in the stratosphere, and bad ozone, produced at ground level by car exhaust and other pollution. The stratospheric ozone layer prevents cancer-causing ultraviolet rays from reaching the Earth. Chlorofluorocarbons (CFCs) leaking from auto air conditioners poke holes in the layer, allowing more UV rays through. (see "AIR CONDITIONER")

On hot, sunny days, hydrocarbons and nitrogen oxides emitted from autos form ground-level ozone. (See "EXHAUST") Humans, designed to breathe O₂ (oxygen), don't take well to ozone's additional atom. Children, the elderly and people with respiratory ailments like asthma have difficulty breathing when ozone levels are high; many are forced to stay indoors. Even healthy

people exercising outdoors during ozone alerts may be gasping for more air than usual.

Clean Air Act: the 1970 law cleared much of the smoke from America's skies, but we can't stop there. Amended in 1990, the act sets tougher limits on auto emissions and proposes transportation controls, especially for southeastern Wisconsin and other urban areas where ozone is a problem.



PAINT, PARTS CLEANER, POLISH AND WAX

Buy small quantities of these automotive products. When possible, use biodegradable, low-phosphorus products packaged in recyclable containers. Share what you don't use with neighbors, community groups or school auto classes. Don't dump leftovers down the drain, on the ground or in a storm sewer. If you must throw these items in the trash, contact your local fire department, county government, or the Wisconsin DNR for safe hazardous materials handling and disposal procedures.



ROAD SALT

Here in the northern climes, winter presides over an annual conflict between slippery roads, driver safety and environmental degradation. Road salt pollutes surface and groundwater, kills trees and grass, corrodes auto bodies and metal bridges, rots underground cables and causes pavement to disintegrate. But road salt also makes car travel possible from October to March.

An insurmountable dilemma? Not quite. Use sand on your own driveway, if you need it after shoveling, and encourage your city and county highway departments to use less salt. The war against sodium chloride is not a stale one: the Wisconsin Department of Transportation regularly tests new deicing compounds, and hurries to apply treatments to highways before storms so that snow has less chance of bonding to the road in the first place. These efforts all reduce the amount of salt dumped on Wisconsin highways. The search continues for a safe, inexpensive, environmentally friendly deicing compound to replace salt.

Until then, wash your car in winter to remove encrusted salt and prevent corrosion. Better yet, hire a sled-dog team and keep the coupe in the garage until April Fool's Day.

SALVAGE YARDS

Old cars never die; they just rust away. So follow a regular maintenance schedule to keep your heap off the scrap heap. Ask for rebuilt or used parts when the time comes for repairs. And when you're buying a new car, why not write the automakers to demand that the auto industry use more recycled and recyclable materials in new car construction? The average 3,080-pound car contains about 2,310 pounds of recyclable metals (aluminum, iron and steel, copper, zinc, etc.), and 770 pounds of plastic, very little of which can be recycled. When it's time to park the car for good, take it to a salvage yard that reuses and recycles as much of the entire vehicle as possible, rather than just plucking off the major parts and grinding up the rest. Think of it as an auto "organ donation" program.

SHORT TRIPS

For short hops, try walking or biking. (See “BICYCLES,” “FEET”) If you must drive, combine errands into one trip. This reduces your total miles traveled and the fuel consumed.

TIRES

Inflation. It's a dirty word to economists, a necessity to green motorists. Americans waste two million gallons of gas each day because our car tires are underinflated. Gas mileage drops about one percent for every pound of tire pressure below the recommended level.

The solution: Regular check-ups. Keep a hand gauge in the glove box and check tire pressure twice a month when the tires are cold. Add air if necessary. (Look in the owner's manual for the proper psi, or pounds of air per square inch.) Check the pressure more frequently in winter – for every 10-degree drop in temperature, tire pressure decreases by one pound.



Besides increasing fuel economy and safety, properly inflated tires last longer, so there are fewer to add to the waste stream. If you rotate your tires as advised in your owner's manual, you can keep them even longer. Maintaining proper wheel alignment and chassis repair according to your owner's manual will also increase the life of your tires. And while you're at it, buy low rolling resistance radial tires – they'll give you better mileage. When it's time to buy new tires, make sure the dealer will recycle your old ones!



TRUNK

No ifs, anvils, or buttresses: You get four percent less gas mileage for every 100 pounds of excess weight carried in your car. Clean out that trunk today.

TUNE UP

A car in tune consumes 20 percent less fuel and spews less heat-trapping carbon dioxide into the atmosphere. Tune-up as recommended by your owner's manual to keep your machine green. And always respond promptly to your “ser-

vice engine soon" light. These key emission control parts should be inspected during a tune-up:

Charcoal canister – absorbs gasoline fumes from fuel system and routes them into the engine.

Positive crankcase ventilation valve – The PCV system recycles gases into the engine for combustion.

Exhaust gas recirculation – The EGR system cuts down on the formation of nitrogen oxides, which sunlight transforms into smog.

Fuel Injectors – Deliver the right amount of fuel to the cylinders.

Catalytic converter – Turns carbon monoxide and unburned gas into carbon dioxide and water. Newer converters also break down nitrogen oxides.



Other items to check during a tune-up: Dirty *air filters* cause the air/fuel ratio to be too rich. Clogged *fuel injectors* produce a mix too lean or too rich, which hurts your engine, your fuel economy and the atmosphere. Worn *spark plugs* *misfire*, causing fuel to pass through the exhaust system unburned. A *thermostat* that lets the engine run too cool or too hot wastes gas. Change or adjust these parts according to the schedule in your owner's manual to keep emissions down.

WINTER WHEELING

Avoid using quick-start aerosol sprays to start your car – many contain volatile organic compounds (VOCs), which are released into the air the moment you press down on the nozzle. Keep the engine tuned up and use a block heater to guarantee winter starts. If you keep the gas tank full, you won't need to pour in fuel additives to dry up the water that condenses in a half-empty tank. Instead of using petroleum-based solvents to loosen frozen locks, try an electric hair dryer.

CAN'T GET ENOUGH?

For more information about making your car a Greener Machine, visit the Wisconsin DNR website: <http://www.dnr.state.wi.us>



WISCONSIN DEPARTMENT OF NATURAL RESOURCES
PUBL-CE-053-00

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Wisconsin Department of Natural Resources
Revised March 2000

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PRINTED ON RECYCLED PAPER

GP5/00